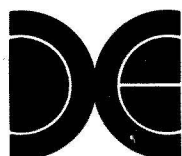
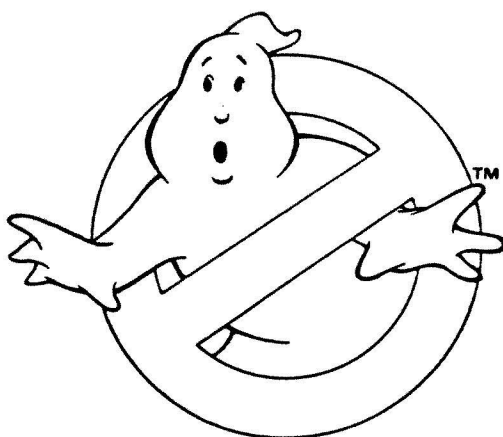


THE REAL GHOSTBUSTERS™

2 PLAYER CONVERSION KIT

MODEL NUMBER 1US30K

INSTALLATION & SERVICE MANUAL



DATA EAST USA, INC.

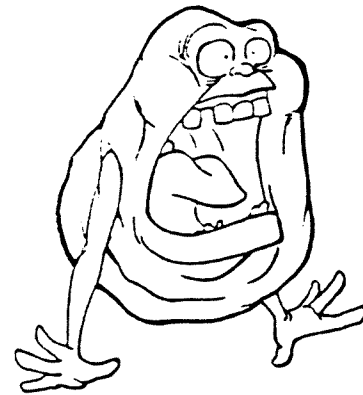
470 NEEDLES DRIVE
SAN JOSE, CA 95112
TELEPHONE: (408) 286-7074

MANUAL PART NUMBER: 780-0070-01

FCC WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with its instructions manual, may cause harmful interference to radio communications. This equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC regulations, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment.

Operation of this equipment in a residential environment is likely to cause interference which the user, at his own expense, will be required to take whatever measures are necessary to correct the interference.



ENVIRONMENTAL DATA

This product is intended for indoor use only, power requirements are 105-125 volts AC 50-60 hz, and requires a 3 wire grounded outlet.

FBI WARNING

Federal law provides severe civil and criminal penalties for the unauthorized reproduction, distribution, or exhibition of copyrighted audiovisual works and video games. The Federal Bureau of Investigation investigates allegations of criminal copyright infringement.

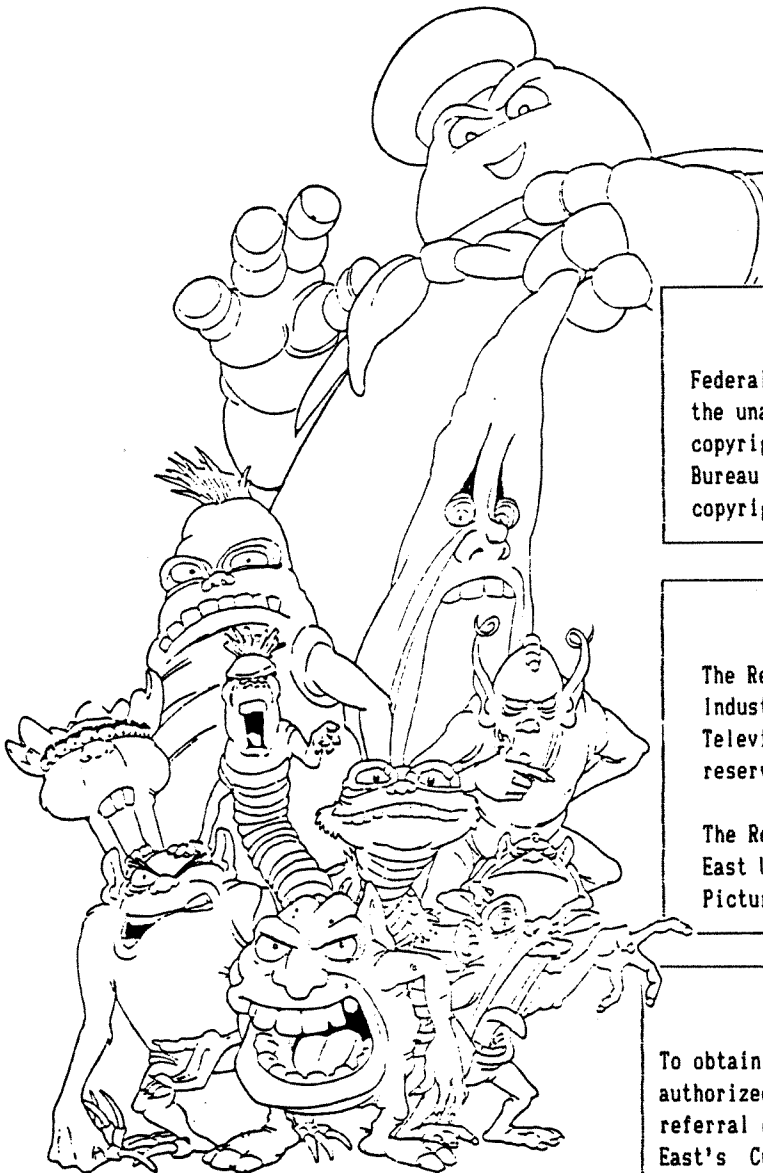
COPYRIGHT NOTICE

The Real Ghostbusters is Copyright 1984 Columbia Pictures Industries, Inc. Copyright 1986 Columbia Pictures Television, a division of CPT Holdings, Inc. All rights reserved.

The Real Ghostbusters video game is Copyright 1987 by Data East USA, Inc. All rights reserved, licensed from Columbia Pictures Industries, Inc.

REPLACEMENT PARTS AND SERVICE

To obtain replacement parts or technical assistance, contact the authorized Data East distributor in your area. If you require referral or further technical assistance, you may contact Data East's Customer Service department during the hours of 8:00 am to 5:00 pm Pacific Time at (408) 286-7074.



GHOSTBUSTERS 2P

MODEL NUMBER 1US30

INSTALLATION & SERVICE MANUAL

TABLE OF CONTENTS

1. GENERAL INFORMATION

- A. Specific Requirements.....1
- B. List of Materials.....1
- C. Installation Instructions.....2

2. GAME INFORMATION

- A. Game Options.....6
- B. PCB Edge Connector Pin-Out.....7
- C. Main Harness Edge Connector Pin-out.....8

© 1988 DATA EAST USA, INC.
470 NEEDLES DRIVE
SAN JOSE, CA. 95112
(408) 286-7074

FIRST PRINTING
FEBRUARY 1988

PN: 780-0070-01

1. GENERAL INFORMATION

A. Specific Requirements.

The Ghostbusters 2P game is a One or Two Player video game conversion kit. It is intended to be installed into an existing video game cabinet and comes with all the necessary components to make the converted game look and play like a new dedicated game!

THE GAME TO BE CONVERTED MUST MEET THE FOLLOWING REQUIREMENTS

MONITOR	Horizontal, RGB, negative Composite Sync input.
POWER SUPPLY	+ 5 vdc @ 7 amperes, and + 12 vdc @ 1 ampere (min)

B. List of Materials.

QTY	DESCRIPTION	PART NUMBER
1	PCB, GHOSTBUSTERS 2P	510-0110-01
1	PCB, EMI FILTER, DE-0239	520-0083-00
1	MAIN HARNESS, GENERIC KIT	036-0154-00
2	JOYSTICK, 8 WAY, MICROSW., CC	450-0014-01
2	PUSHBUTTON ASSY, RED	350-0016-02
4	PUSHBUTTON ASSY, YELLOW	350-0016-04
4	PUSHBUTTON ASSY, BLUE	350-0016-06
1	CONTROL PANEL OVERLAY, GENERIC	800-0030-00
1	UNDERLAY CARD, GENERIC, H-V	810-0014-00
2	LABEL, BUTTON ID, GENERIC	406-0085-00
1	LABEL, INSTRUCTIONS, GHOSTBUSTERS	406-0078-00
2	SIDE DECAL, GENERIC	820-0040-00
1	MARQUEE PLEX, GHOSTBUSTERS	830-0033-00
1	FCC WARNING LABEL	406-0003-00
1	MANUAL, INSTALLATION & SERVICE	780-0070-01

C. Installation Instructions.

When selecting a game to convert, make sure that the Power Supply, the Monitor, and the Coin Acceptors are functional. There is nothing more frustrating than installing a conversion kit and having it not operate due to a faulty Monitor or Power Supply. I know...we will all suspect that the new Logic PCB is defective, right?

It is mandatory that the cabinet be wired to conform with all National and Local Electric Code requirements before the conversion is attempted. The primary section must have adequate noise filtering on the AC line to prevent unwanted conducted radio frequency interference. 'Adequate' is defined as a filter with both common mode and differential mode filtering and a minimum current capacity of 1 ½ amperes.

According to the FCC and other regulatory agencies, every video game must have be clearly labeled with the Name and Address of the Original Manufacturer, Date of Manufacture (or serial number), Voltage Rating, Current Rating, Suitability for indoor or outdoor use, and Model Number. In addition, the FCC requires that after conversion, the unit must be labeled with a suitable warning stating that radio frequency interference may result from use in a residential area. An acceptable sticker is included in this kit.

IT IS THE RESPONSIBILITY OF THE PERSON PERFORMING THE INSTALLATION
TO COMPLY WITH ALL LABELING REQUIREMENTS.

TAKING IT APART...

Performing a few simple tasks when preparing a game to be converted can save you much time and effort when you are installing the conversion kit.

Find the wiring diagram of the game to be converted! You will need to identify the required DC power supply output wires and the monitor video and sync wires. Note the color coding of these wires or better yet, label them as to their function. This kit contains a new Main Harness, but you will need to splice it into the existing power supply and video wires.

Remove the existing game harness parts that will not be used in this conversion. NOTE: You are modifying only the secondary (DC from power supply) and I/O (video, speaker, and controls) section of the wiring. DO NOT MODIFY OR REMOVE THE PRIMARY AC WIRING. The primary AC wiring has been designed and built to comply with UL and FCC regulations and must not be altered.

C. Installation Instructions (cont.)

Remove the game pcbs. Remove all exterior decals and repaint the cabinet if necessary. Repair any cabinet damage at this point. Remove the monitor plex (or glass). If your plex has silkscreened artwork on it, you will need to strip it off, or replace the plex with a piece cut to the same size. Using the Monitor Plex as a template, cut the supplied Underlay Card to the same size as the plex. **NOTE: Be certain that the opening in the Underlay Card lines up with the Monitor CRT.**

Remove the Marquee Plex from the game and use it as a template to cut the new Marquee Plex down to the correct size. Remove the control panel from the game and remove all controls and graphics from it.

PUTTING IT TOGETHER...

Control Panel: This is never any fun, so lets do it first and get it out of the way. Select a button and joystick layout that fits your control panel size. Refer to figure 1 for the suggested panel layout.

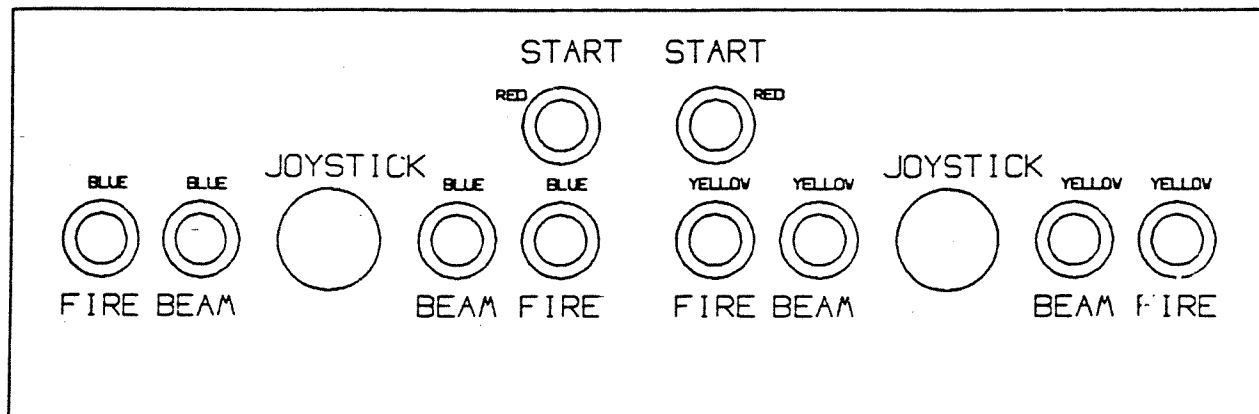


Figure 1

C. Installation Instructions (cont.)

Install the Control Panel Overlay by peeling off the paper backing and carefully laying the overlay down onto the panel. Smooth it out starting in the center and working your way out to the edges, removing all of the trapped air pockets. If possible, cut the edges of the overlay oversize and fold the excess under the panel. Cut out the button and joystick holes. Install the Control Function Labels found on the sheet of labels supplied in your kit. NOTE: Install the Control Function Labels in the formation shown in figure 1.

Cover the Control Panel Overlay and Control Function Labels with a clear plex to protect the overlay and labels. Install the buttons and joystick at this time. Mount the completed control panel to the cabinet.

Game PCB: Mount the game PCB set to a convenient wall of the cabinet using the mounting feet and hardware supplied with the pcb. Plug the EMI Filter PCB onto the game PCB set.

Power Supply Wiring: Plug the Main Harness edge connector onto the EMI Filter PCB's edge connector. Separate the DC Power wires and route them through the cabinet to the Power Supply. Try to keep the length of these wires to a minimum for best results. NOTE: Use a minimum of 2 wires EACH for the +5 Volts and the Ground lines between the power supply and the PCB. Terminate them at the Power Supply as required.

NOTE: IMPROPER WIRING WILL DAMAGE THE PCB SET AND VOID YOUR WARRANTY!

Player Control Wiring: Route the Pushbutton and Joystick wires up to their proper destinations, cut to length, and terminate as required.

REFER TO THE EDGE CONNECTOR PIN-OUT ON PAGE 8 FOR WIRE COLOR AND FUNCTION INFORMATION.

C. Installation Instructions (cont.)

Monitor Wiring: The game PCB set has outputs for Positive Red, Green, Blue, and Negative Composite Sync. If your monitor has separate Horizontal and Vertical sync inputs, hook the Composite sync to the negative Horizontal input. This method will work on most monitors, however some model Electrohome's require that the Composite sync signal be hooked up to both the negative Horizontal and Vertical inputs. Contact your distributor for more information if you are uncertain as to how to hook up the monitor wires.

Coin Door: The Coin Counter(s) may be the 12 volt or 6 volt type as the game PCB utilizes an open collector drive circuit. Hook one coin counter wire to the required voltage (+12v or +5v) and the other wire to the coin counter signal wire from the game PCB.

Graphics: Install the Game Instruction Labels onto the Underlay Card, either in the lower portion, or on one side of the picture tube cutout. Install the Underlay Card under a clear monitor plex (or glass). Mount the new Marquee Plex, and install the Side Decals. **NOTE: Install the FCC Warning label to the upper rear of the cabinet.**

THE BIG TEST!

REMOVE THE MAIN HARNESS EDGE CONNECTOR FROM THE GAME PCB!

Apply power to the game. **Measure the +5 volts** at the edge connector and **adjust to +5.15 VDC** using a Digital Multi-Meter. Measure the +12 and -5 vdc wire to be certain they are connected properly and are on the correct terminals. Remove power to the game.

RE-CONNECT THE MAIN HARNESS EDGE CONNECTOR!

Apply power to the game once again. The attract mode video should appear on the screen. Adjust the picture size and colors on the monitor to get the optimum appearance. Adjust the Sync and Hold controls on the monitor for a stable picture. Coin it up and give it a try! Test all the controls and sound for proper operation.

Congratulations! You have successfully installed your Data East conversion kit! We hope that it gives you many years of successful operation.

2. GAME INFORMATION

A. Game Options.

The Ghostbusters 2P game options can be fine tuned to suit the location via two sets of dip-switches on the Game PCB. Remove power to the game before changing the settings to avoid possible shock hazards. Unused switches indicated should be left in the OFF position as shown for proper operation. Factory settings are **boldface**.

DIP SWITCH 1

REMARKS	1	2	3	4	5	6	7	8
COIN 1 COIN = 1 PLAY	OFF	OFF						
VS 1 COIN = 2 PLAY	ON	OFF						
CREDIT 1 COIN = 3 PLAY	OFF	ON						
2 COIN = 1 PLAY	ON	ON						
NOT USED MUST BE OFF			OFF	OFF	OFF			OFF
ATTRACT MODE YES							OFF	
SOUND NO							ON	
SCREEN NORMAL								OFF
FLIP FLIP								ON

DIP SWITCH 2

REMARKS	1	2	3	4	5	6	7	8
NUMBER OF THREE	OFF	OFF						
LIVES FIVE	ON	OFF						
ONE	OFF	ON						
INFINITE	ON	ON						
LEVEL OF NORMAL			OFF	OFF				
DIFFICULTY EASY			ON	OFF				
HARD			OFF	ON				
HARDEST			ON	ON				
SCENE 5:00					OFF	OFF		
TIME (MAX) 6:00					ON	OFF		
IN 4:30					OFF	ON		
MINUTES 4:00					ON	ON		
CONTINUE NO								OFF
MODE YES								ON
BEAM ENERGY NORMAL								OFF
PICK-UP UP 1.5%								ON

B. PCB Edge Connector Pin-Out.

The game PCB set uses a 56 pin 'JAMMA' standard Edge Connector pin-out as shown below in figure 2. Please note that the Main Harness supplied in the kit utilizes the pin-out and wire colors shown in figure 3 on the following page.

SOLDER SIDE	PIN #		PARTS SIDE
GND	A	1	GND
GND	B	2	GND
+5V	C	3	+5V
+5V	D	4	+5V
	E	5	
+12V	F	6	+12V
MISTAKEN INPUT PREVENTION	H	7	MISTAKEN INPUT PREVENTION
COIN COUNTER 2	J	8	COIN COUNTER 1
	K	9	
SPEAKER (-)	L	10	SPEAKER (+)
	M	11	
VIDEO GREEN	N	12	VIDEO RED
VIDEO SYNC	P	13	VIDEO BLUE
SERVICE SWITCH	R	14	VIDEO GND
	S	15	
COIN SWITCH 2	T	16	COIN SWITCH 1
START SWITCH 2	U	17	START SWITCH 1
2P CONTROL 1 UP	V	18	1P CONTROL 1 UP
2P CONTROL 2 DOWN	W	19	1P CONTROL 2 DOWN
2P CONTROL 3 LEFT	X	20	1P CONTROL 3 LEFT
2P CONTROL 4 RIGHT	Y	21	1P CONTROL 4 RIGHT
2P CONTROL 5 PUSH 1	Z	22	1P CONTROL 5 PUSH 1
2P CONTROL 6 PUSH 2	a	23	1P CONTROL 6 PUSH 2
	b	24	
	c	25	
	d	26	
GND	e	27	GND
GND	f	28	GND

Figure 2

C. Main Harness Edge Connector Pin-Out.

The DE-0239 EMI Filter PCB uses a 44 pin DECO standard Edge Connector pin-out as shown below in figure 3.

SOLDER SIDE			COMPONENT SIDE		
WIRE COLOR	FUNCTION	PIN #	PIN #	FUNCTION	WIRE COLOR
GR/WH	2P DOWN	A1	B1	1P DOWN	GR
YL/WH	2P UP	A2	B2	1P UP	YL
OR/WH	2P LEFT	A3	B3	1P LEFT	OR
RD/WH	2P RIGHT	A4	B4	1P RIGHT	RD
PK/WH NOT USED	2P PUSH3	A5	B5	1P PUSH3 NOT USED	PI
	NOT USED	A6	B6	NOT USED	
	NOT USED	A7	B7	NOT USED	
	NOT USED	A8	B8	NOT USED	
BL/WH	2P PUSH1 (FIRE)	A9	B9	1P PUSH1 (FIRE)	BL
VI/WH	2P PUSH2 (BEAM)	A10	B10	1P PUSH2 (BEAM)	VI
RD/WH	2P START	A11	B11	1P START	BR
RD	COIN 2	A12	B12	COIN 1	GR
SL	COUNTER 2	A13	B13	COUNTER 1	VI
GR/WH	VIDEO GREEN	A14	B14	VIDEO BLUE	BL/WH
RD/WH	VIDEO RED	A15	B15	VIDEO SYNC	WH/BK
	NOT USED	A16	B16	NOT USED	
BK/WH	SPEAKER (-)	A17	B17	SPEAKER (+)	WH
BL	- 5 VOLTS	A18	B18	+ 12 VOLTS	OR
RD	+ 5 VOLTS	A19	B19	+ 5 VOLTS	RD
RD	+ 5 VOLTS	A20	B20	+ 5 VOLTS	RD
BK	GROUND	A21	B21	GROUND	BK
BK	GROUND	A22	B22	GROUND	BK

Figure 3

WARRANTY INFORMATION

Data East USA, Inc., ("Seller"), warrants only to the original purchaser ("Buyer"), of its products that the items listed below are free from defects in material and workmanship under normal use and service for the period specified:

GAME LOGIC PRINTED CIRCUIT BOARD(S)

90 DAYS

No other parts of the Seller's products are warranted.

Warranty periods are effective from date of initial shipment from Seller to Buyer. Seller's sole liability shall be, at its option, to repair or replace products which are returned to Seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by buyer that stated products are defective.
2. Such products are properly packaged and then returned freight pre-paid, to a place specified by Seller.

This warranty does not apply to products damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall Seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages, or any other losses incurred by the customer in connection with the purchase of a Data East USA, Inc., product.

WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND BUYER, THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.